CENTER FOR INSTITUTIONAL REFORM AND THE INFORMAL SECTOR

University of Maryland at College Park

Center Office: IRIS Center, 2105 Morrill Hall, College Park, MD 20742
Telephone (301) 405-3110 • Fax (301) 405-3020
E-mail:info@iris.econ.umd.edu
World Wide Web: http://www.inform.umd.edu/IRIS/

The Allocation of Publicly-Provided Goods to Rural Households in India: On Some Consequences of Caste, Religion and Democracy

Roger Betancourt
and
Suzanne Gleason

Working Paper No. 217

June 1998

This publication was made possible through support provided by the U.S. Agency for International Development, under Cooperative Agreement No. DHR-0015-A-00-0031-00 to the Center on Institutional Reform and the Informal Sector (IRIS) and administered by the Office of Economic and Institutional Reform, Center for Economic Growth, Bureau for Global Programs, Field Support and Research.

Authors: Roger Betancourt, IRIS Center, University of Maryland, College Park.
Suzanne Gleason, Bureau Of Economics, Federal Trade Commission, Washington, D.C.

The Allocation of Publicly-Provided Goods to Rural Households in India: On Some Consequences of Caste, Religion and Democracy.*

Roger Betancourt
D. of Economics
U. of Maryland
College Park, MD 20742

Suzanne Gleason
Bureau of Economics
Federal Trade Commission
Washington, DC, 20580

Revised, November 1997

* Initial research on this paper was undertaken while Betancourt was on a sabbatical leave from the University of Maryland, which is gratefully acknowledged. This work represents the opinions of the authors and is not intended to represent the position of the Federal Trade Commission or any individual Commissioner. We thank R. Vanneman and D. Barnes for making the Indian District Data Base available to us and the Computer Science Center at the U. of Maryland for its support. Earlier versions of the paper were presented at the Eastern Economic Association meetings , the U. of Maryland International Economics and Development Workshop, and Rutgers U. We would like to thank the participants for their comments. Anand Swamy, and Jon Harford gave us extensive comments on earlier versions and Carlos Seiglie was helpful on the current one. We also benefitted from conversations with Praveen Kumar. We thank them without incriminating them.

Coauthors: Roger Betancourt, Suzanne Gleason

Affiliations: U. of Maryland, Federal Trade Commission

Title: The Allocation of Publicly-Provided Goods to Rural Households in India: On Some Consequences of Caste, Religion and Democracy

Abstract:

In this study we address the following question-- what determines the allocation of *publicly-provided goods to rural households in India*? We draw on the characteristics of India's institutional structure and the implications of existing literature for framing the answer to this question. On this basis, we argue that political participation acts as a signalling device through which the principals (the electorate) exert pressure on the agents (state governments) to implement their preferences in the allocation of publicly-provided goods to households. We confront the main empirical implications drawn from the literature with a unique data set for India which brings together the widely used district data with a recently constructed data set on political participation. Our empirical results show that political participation is a substantively important determinant of the allocation process. Nonetheless features of redistributive majorities are also important in this process, leading to systematic discrimination against scheduled castes and muslims in rural areas. Our results also suggest that the responsiveness of the political process to voters' signals is greater in middle and high income states than in low income states.

JEL Classification numbers: H4; D72; O18; O53

Key Words: allocation of publicly-provided goods; political economy models; fiscal decentralization in developing countries; rural India.

A principal aim of this paper is to raise and provide evidence on the following question: What determines the allocation of publicly-provided goods, in particular medical and educational services, to rural households in India?

In most societies, both developed and developing, the government or state plays a critical role in providing health and education services to households as public goods. These services include, for example, access to safe drinking water, clinics and schools. While some of these goods are not pure public goods and can be privately provided, they are publicly provided in most countries and our objective is to understand this process and its consequences. In the case of India public provision is the major form of provision in rural areas. For instance, in their analysis of the health care sector in India Duggal, Nandraj and Vadair (1995) stress the inequality in access to health care between rural and urban areas and point out that access to private practitioners in rural areas is access to non-allopathic systems or to persons without any qualifications.

Fiscal decentralization in developing countries is receiving increasing attention and support among researchers , for example Oates (1997), and policy analysts, for example World Development Report (1997). Nevertheless the support is subject to qualifications. Thus, Oates stresses the importance of hard budget constraints at lower levels of government and the WDR discusses this and other 'pitfalls' of decentralization (Ch.7). Empirical work at the macro level, Davoodi and Zou (1997) and Zhang and Zou (1997), shows a negative impact for fiscal decentralization on economic growth in developing countries. This context enhances the relevance of studying the specific institutional arrangement whereby health and education services are provided to rural households in India. For, as we shall demonstrate in the next

section, in this case the responsibility for providing these public services has been decentralized through its delegation to the state governments by the central or union government since independence.

India's experience is also of interest because it has been a democracy for the last 50 years. Few developing countries can make this claim, especially when attention is restricted to the poorer and bigger ones. Yet, recent years have seen moves toward democracy in many developing countries. Thus, the question of which features of the democratic process affect the outcomes of the allocation process for public provison of health and education services is one of increasing relevance and it will be the main focus of our investigation.

The plan of the paper is as follows: In the next section we describe those features of India's institutional structure that condition our empirical analysis. In Section 2 we discuss the literature that has a bearing on our topic and draw its implications for explaining the outcomes of the allocation process for providing health and education services to households in India's rural districts. In Section 3 we discuss the details of the data, the interpretation and measurement of the variables and the econometric procedures implied by the previous discussions. In Section 4 we present the empirical results. We conclude by providing some perspective on our analysis.

1. India's Institutional Structure [1]

One must be cognizant of certain features of the Indian federal system in order to arrive at a sensible empirical specification. There is a formal division of authority between the states and the central or union government. This division is recognized in the 1950 Constitution but it

---

[1]The discussion below draws heavily from Thakur (1995), especially Ch. 3 on federalism and Ch. 7 on bureaucracy, unless otherwise indicated.

actually predates independence. Schedule seventh of the 1950 Constitution continues this tradition with a tripartite list of powers in which the 97 item exclusive Union List includes currency, income tax, foreign affairs and defense, for example, and the 66 item State List includes health, education, agriculture and land revenue, for example. Similarly, a 47 item Concurrent List gives shared jurisdiction to the states and the central government over items such as civil and criminal law and social and economic planning. Thus, according to the Constitution, decisions about the provision of public goods in the areas of health and education are made at the state level.[2]

Implementation of this formal division of powers, however, requires financial resources, state level governmental structures and administrative capabilities. On the financial side, in the mid 1980's the states were spending about 60% of all tax revenues collected by both the states and the central government but they were raising only about 35 % of the total tax revenues. The required transfer of resources to the states from the central government takes place in a number of ways. For instance Finance Commissions, required by the Constitution at five year intervals, have recommended that between 55 and 67 % of the income tax be assigned to the states. These recommendations are mandatory on the central government. Nevertheless, similar recommendations on excise taxes are discretionary. Grants in aid to the states are also made

---

[2] Formally the central government can override state preferences in exceptional times, but within constitutional limits and for prescribed periods of time. In addition, certain aspects of items in the States List can be reserved for the Union. For instance, in his analysis of constitutional provisions for states-centre relations on education, Hartmann (1975, p.187) concludes "...while education including University education is by and large the responsibility of the States, the Centre has been invested with overriding powers with regard to certain aspects of education presumably deemed to be of national importance." Examples of these aspects are scientific and technical assistance for research and vocational and technical training of labour.

under either the recommendations of the Finance Commissions, which are mandatory and the aid is unconditional, or at the discretion of the Parliament of India, which can attach conditions to it. About 70 % of the grants in aid are made under the parliamentary authority, usually based on the recommendations of the Planning Commission.[3]

On the basis of these arrangements the states have considerable discretionary financial resources, on their own and through mandatory transfers. Moreover, even with respect to the conditional grants in aid, one can argue that financial aid is always fungible to some extent regardless of conditionality.[4] Fungibility is greater, the greater are substitution possibilities in state preferences and/or independent sources of income. Therefore, it is reasonable to view the provision of health and education services to rural households in India as determined at the state level rather than at the central government level in practice as well as in theory on the basis of financial considerations.[5]

According to Maheshwari (1979) the business of government at the state level involves three different institutions: the governors and the council of ministers, the secretariat and the departments. While the governor is appointed by the President, the ministers are elected members of their state legislatures. They represent the political executive. To aid them in their

---

[3]Incidentally, Rao(1996) provides a recent analysis of tax and expenditure assignments between the States and the Centre from a public finance perspective and suggests various areas in need of reform.

[4]The fungibility of grants in aid to the states in the United States is well established, for example see Zampelli (1986). Similar findings arise in the context of international aid, for example see Pack and Pack (1993).

[5]These financial arrangements allow state governments to spend 84.9% (92%) of all expenditures on education (health) by both states and the central governments, Rao(1996).

labors there is a secretariat, which is a complex of departments whose administrative heads are secretaries and political heads are ministers. Associated with these secretariat departments are executive departments or directorates. The latter have their own head, who is usually a specialist, that reports to the secretary of the corresponding department in the secretariat, who is usually a civil servant and normally from the Indian Administrative Services (IAS).[6] There is for each state a medical, and education department as well as many others. States have public services, usually regulated by state public service commissions, that correspond to these departments. The latter have field offices in the administrative districts which are responsible for executing the policies and decisions of the state government.

The key administrative unit in the states is the district. For instance, Maheshwari (1979, p.95) asserts "The basic territorial unit of public administration in India is the district into which the whole of India is subdivided ... A district is also the unit of administration for various other state departments, like police, cooperative societies, agriculture, education, medical, etc., which have their jurisdiction extending over the district." If a village headmaster does not get paid, for example, his main recourse would be to travel to the district seat to visit the district education officer as the poignant story in Mathur (1995, p.178) illustrates. Since states vary in size and population, districts within a state also vary along these dimensions as well as with respect to other administrative units that may exist between them and the state (divisions) or between them and the villages (blocks, subdivisions or tahsils).

From our perspective this governance structure allows voters at the state level to have an

---

[6]The number of public sector employees in India is 17 million while IAS officers are fewer than 5000, Mathur (1995, p.166).

influence in principle on the public goods provided by these departments through the influence of their voting behavior on the members of the state legislatures. The latter serve on the council of ministers; some are responsible for these departments as ministers; and others serve on legislative committees that supervise various aspects of the operation of these departments. Similarly, this governance structure allows the bureaucrats in the departments at the state or district level to exert an influence on outcomes independently of the elected politicians.

Manor (1992) discusses the governance structures of state governments in India by identifying three dimensions: political ideology, managerial style, probity and effectiveness. The first one leads these governments to range from communist to conservative. The second one leads these governments to range from a very centralized style to a very decentralized one. And, the third one leads these governments to range from very corrupt to not very corrupt. According to Manor (1992), very centralized or very decentralized styles both lead to corruption and ineffectiveness of the usual political process. What this means for our purposes is that there will be intrinsic differences between the state governments in the allocation mechanisms they use to provide health and education services to rural households in their districts.

Before concluding mention must be made of local government institutions, especially in rural areas. These institutions are part of the States List according to the Constitution. Since October 1952 various attempts have been made to develop rural local government institutions as part of community development programmes or rural development. In 1957 a committee evaluated the failure of this system and recommended reforms. In 1978 a second committee on these institutions suggested additional reforms. Perhaps the most important one was emphasis on control at the district level in order to coordinate with the state administration. Maheshwari

(1979, p.269) evaluates these reforms of the rural local government system as follows:"It would have been more rational if it is regarded, like its counterparts at the state and central levels, as a system of government having a measure of autonomy in the matter of its functioning and existing in its own right." Since it was not regarded as a system of government, in the early 1990's constitutional amendments were passed trying to formalize the role of these institutions across the states, Oomen and Annamalai (1994). In any event, the thrust of our argument is that the past ineffectiveness of rural local government institutions in India is well recognized.

2. The Literature and Its Implications.

Since we are interested in the provision of public goods to households, a natural starting point would be the theory of local public finance. Unfortunately, this literature is based on two premises that are unlikely to be applicable to most developing countries, including India, Ball and Linn (1992). First, local decisions are seen as responsive to local demands. But, we saw in the previous section that local decisions (at the district level in our case) are made at a nonlocal level (namely the state level). Second, local finance is determined by households' mobility. But, household mobility is limited in rural India. While there is internal migration in India, this migration takes place within districts not across districts, Rosenzweig (1988). The districts are our basic unit of analysis.

A more useful starting point for our purposes is the development literature. This literature suggests that the analysis of the role of governments in developing countries should be viewed in terms of a multilevel principal-agent framework, Lin and Nugent (1995). At the first level, the rulers, or elected politicians in our case, act as agents for the citizens, or electorate in our case, who play the role of principals. At the second level, the rulers or elected politicians act

as principals and the bureaucrats and/or technocrats act as agents for these politicians. The governance structures described in the previous section fit the broad outlines of this approach and, thus, we will use this approach as our basic framework.

In this setting political participation through voting can be interpreted as a signalling device through which the principals (voters) send a message to the agents (members of the stae legislature) with respect to the allocation of public goods such as health and educational services. The content of the signal or message, however, is revealed to the observer by the association between voting and the outcomes of the allocation process for providing medical and educational services. If voting has no impact on the outcomes of the allocation process, the content of the message is that the desired amount was provided. If voting is positively (negatively) associated with the allocation outcomes, the content of the message is that the public goods were underprovided (overprovided) and the politicians responded by increasing (decreasing) the provision of public goods. While this interpretation assumes other things equal, including the level of taxation, we saw in the previous section that in India the devolution of responsibility to the state governments on the expenditure side is quite separate from the taxation side.

While the desired amount of public provision of health and education services is an elusive concept, one reference in the literature provides a useful benchmark and ties in with the previous discussion. In McGuire and Olson (1996) the desired amount would correspond to the level provided by an idealized consensus democracy, which in their analysis is equivalent to what a benevolent dictator would choose. That is, in their idealized consensus democracy the level of a public good that increases market output is selected to maximize society's output and a proportional tax is imposed which just finances provision of this level of the public good, while

taking into account the distortionary effects of taxation. Thus, selection of the optimal level of the public good is independent of the level of taxation in their model and consistent with our interpretation of the role of political participation in the previous paragraph.

In McGuire and Olson's view one of the fundamental features of majority rule governments is that they redistribute income to themselves from minorities, in addition to providing public goods. They use their model to show that, if the fraction of the total income produced and earned in the market that accrues to the majority is large enough (a super-encompassing interest is present in their terminology), a majority rule government will choose out of self-interest the same level of taxation and the same level of public good provision as their consensus idealized democracy.[7] Thus, if political participation has no effects on the outcomes of the allocation process, we can interpret this result as suggesting that a majority with a super-encompassing interest is in power; if it does have an effect, we have a redistributive majority in control.

More generally, the concept of redistributive majorities suggests that characteristics of minorities which the majority may want to redistribute from should affect the outcomes of the allocation process when the redistribution takes place through the provision of health and education services. McGuire and Olson consider only the possibility of redistribution through the taxation process and not through the spending process. We will explore the possibilities of redistribution through the spending process in our empirical work.

The public choice and political science literature, in general, view political participation

---

[7]A key feature of their analysis is that decision makers take into account the distortionary effects of taxation when choosing the tax rate.

as consumption behavior. This literature relies on the household production model and its opportunity cost of time aspects to explain a well known correlation between income levels and political participation, e.g., Frey (1971,1972), Russell(1972), Fraser(1972) and Crain and Deaton (1978), and it focuses on the determinants of voting behavior. Most of the recent literature on political participation augments the standard economic approach embedded in the earlier work by introducing sociological and psychological variables as well as the role of institutions, e.g., Fowler (1993), but its emphasis is on the determinants of participation rather than on the consequences of participation, as noted by Leighley (1995).

An exception to the above conclusion is the strand of literature concerned with female political participation, which notes that the legislative behavior of females in the U.S. differs from that of males. More specifically, females introduce bills that focus on medical and educational issues while males tend to focus on business bills, e.g., Thomas (1991) and Thomas and Welch (1991). This literature would suggest that, if there is any effect of political participation on public goods, there would be a differential effect of participation by males and females on the provision of public goods such as health and education. That is, for any level of total voting participation the content of the signal or message may vary with the level of participation by females relative to males. We will explore this hypothesis in our empirical work.

With respect to the second principal-agent problem the literature on bureaucracy, for example Niskanen (1971), suggests the existence of rules, for example based on geography or population, that expand the size of the bureaucracy. These rules would affect the outcomes of any allocation mechanism for the provision of public services. Of course, these practices have

their limits because bureaucracies also have incentives to provide public services at low costs as long as these services increase market output and thus revenues. For instance, Findlay (1991) develops a model where it is optimal for the bureaucratic state to minimize costs in order to overprovide (relative to the consensus idealized democracy or benvolent dictator) the level of a public good that increases market output.

3. Data, Measurement and Estimation Procedures.

Two primary data sources underlie our empirical investigation. The first one is a cross-section of the Indian Development District Data, Vanneman and Barnes (1993, Release 3). The data is compiled from the 1981 Indian Census as well as many secondary sources.[8] The second data source is the Indian Election Data for the Vidhan Sabha or state level elections, Gleason (1996, Appendix B, part II). It contains a variety of electoral data for about 3000 constituencies for the state elections in 1977-78. It is possible to aggregate these constituencies to the administrative district in which they lie; Singh and Bose (1987-88) provide a matching table.

All the variables used in the empirical analysis, except for the political participation ones and the number of constituencies, come from the first data base. We are able to identify three variables associated with the provision of health and education services made available to rural households by the state governments: y_1 is the number of doctors in a district's rural areas; y_2 is the number of nurses and other health technicians in a district's rural areas; y_3 is the number of teachers in a district's rural areas. All of them are measured relative to the district's rural

---

[8]This data set has been widely used but the focus of the analysis is always on the explanation of individual behavior, for example variations in fertility rates (Murthi, Guio and Dreze (1995) or variations in child mortality rates (Gleason,1997). Here, we will be focusing on the explanation of the behavior of state governments.

population, i.e., per 10 persons in the rural areas of a district. The first two variables generate indexes of medical services and the third one of educational services provided by the states.

Political participation will be measured by: voter turnout, or the ratio of total voters in the district to total registered voters[9], and the voting ratio, or the ratio of female voters to male voters in the district. Both are taken from the 1977/78 State Legislative elections. As indicated in the previous section, we would expect voter turnout to have a positive (negative) effect for those public services that households perceive as underprovided (overprovided). The sign of the ratio of female to male voters is an indicator of how those who control the allocation mechanism perceive the messages sent by voters of different gender. If positive, it supports the argument suggested by the public choice literature that females value health and education services more highly than males, given that politicians respond to these differential valuations.

Since the responsiveness of the political system to a district's concerns may be influenced by the number of representatives a district has, which is determined by the number of constituencies within a district, we used the number of constituencies in a district as an independent variable. Because constituencies are based on population, more urbanized districts have more constituencies. Hence, the sign of this variable is an indicator of bias in the allocation mechanisms due to a political process based on population: urban bias, if negative; rural bias, if positive.

The proportion of scheduled castes and of Muslims in the rural area of a district are

---

[9]It is worth noting that in India the responsibility for registering voters lies with the government not the individual. Hence, the total number of registered voters should coincide with the population over 21 years of age, except for the insane and convicted felons.

indicators of the presence of minorities. If a majority in a state chooses to redistribute against either of these minorities through the mechanism for allocating health and education services to the districts, we would expect these variables to have a negative effect on outcomes.

Another set of variables that captures a related phenomenon are wealth or income variables. India is a poor country where the political process may lead a poor majority to redistribute to itself through the allocation mechanism for providing public goods. In this case we would expect wealthier or higher income districts to receive fewer health and education services. We included farm size as a measure of wealth, i.e., the total area cultivated in the production of 37 crops divided by total rural households; and agricultural productivity as a measure of income, i.e., total production of 37 crops for which there is price data (valued in 1000's of 1971 rupees) divided by total farm (permanent) workers in the rural area of the district.

We also included a variable that captures wealth concentration in the analysis. Namely, the proportion of farm workers in a district who are laborers, not cultivators. This variable serves as an indicator of the presence of special interest groups in rural areas of a district, since the fewer the members and the more resources at their disposal the easier it is for these groups to organize. The stronger these special interest groups the greater the wedge between the principals and the agents. The sign of this variable, however, depends on the particular purposes for which the special interest groups organize.

The next two variables try to identify bureaucratic characteristics that may affect the allocation of health and education services. If there are either geographical or demographic allocation rules followed by a bureaucracy, they should affect the outcomes that we observe. Thus, the larger the area per person in a rural area of a district, measured in square kilometers per

person or the inverse of rural population density in a district, the more of the above inputs will be needed to provide a given level of access to public services in the rural areas of a district. If a bureaucratic rule based on geography is in place, we should observe a positive effect on outcomes. On the other hand, if a bureaucratic rule based on population is in place, we should observe a negative effect. Another variable that captures bureaucratic features is the percentage of the urban population in a district. The greater this percentage, the more likely there is a greater supply of trained personnel such as nurses, doctors and teachers as well as low cost access to rural areas. Thus, the cheaper it is to supply the rural areas of a district with this type of personnel and we should observe a positive effect on outcomes.

In addition to the ten independent variables just described, we introduced a dummy variable for each state in our sample. These state dummies capture fixed effects that are common to all districts within a state but vary across states due to variations in the allocation mechanisms for each state.

Summing up our arguments in a suitable form for empirical analysis, we postulate the following relationship between the outcomes of the allocation mechanism for providing health and education services to rural households in a district and the characteristics or features of this mechanism discussed here.

$$y_{ij} = e^{\beta X}/(1 + e^{\beta X}) + \epsilon_{ij} \quad j = 1, 2,3. \qquad (1)$$

The vector X includes the ten variables individually identified and a set of 17 state dummy variables.[10] Since our dependent variables are proportions, the logit specification was adopted to

---

[10]The included states are: Andhra Pradesh, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Karnataka, Madhya Pradesh, Maharastra, Meghalaya, Nagaland, Orissa,

ensure that the predicted values fell within the 0-1 interval.

The equations in (1) were estimated as a system because one would expect the disturbance terms to be correlated across equations (j) for any one district (i =1,...,325).[11] For instance, there may be a trade-off in the allocation process for a district between education and health personnel or between different types of health personnel; alternatively, some aspects of the budgetary allocations from the central to the state governments may affect all trained personnel in a district in the same manner. Since all three dependent variables are proportions, heteroskedasticity across districts is also to be expected and we use robust estimates of the variance covariance matrix throughout.

In addition, one can argue that there exists a reverse causation between the level of political participation in a district and the dependent variables in our model. That is, the levels of these public goods may influence the extent of political participation by the electorate. While our political participation variables precede in time the dependent variables, Deaton (1995) has argued that the existence of persistence effects in a cross-section generates simultaneity problems despite the precedence in time of explanatory variables. Since our dependent variables are stocks, persistence effects are likely to exist. Therefore, our main estimation method is nonlinear three stage least squares.

Punjab, Rajahstan, Tamil Nadu, Uttar Pradesh, West Bengal.

[11] Of the 378 districts in the original 1981 Census file we were left with 325 districts with usable data for our purposes. For instance, 8 districts in Assam had no census data due to civil strife. 26 districts had missing data on the political variables. 4 districts were 100% urban. 6 districts had missing census data. 8 districts were aggregated into 4 districts because they were split after the 1977-1978 elections. Finally, 5 districts were eliminated because they were union territories and, thus, centrally administered.

Our initial choice of variables to use in the instruments matrix, besides the included exogenous variables, were education[12] and the ratio of female to male population in a district as well as these variables squared. We experienced convergence problems as a result of multicollinearity between education and some of the other included variables. Consequently, we added the squares of four other exogenous variables to the instruments matrix: proportion of scheduled castes, proportion of rural muslims, rural land per person and urbanization.[13] Our results are not sensitive to the choice of instrument matrix. In the text, we present the results using six of the eight instruments mentioned here, i.e., all but the two education variables, in addition to the included exogenous variables. In an appendix available upon request, we present the results for three alternative choices: using all eight additional instruments ; these eight additional instruments minus the squares of the two minorities variables (scheduled castes and muslims) and these eight instruments minus the squares of the two bureaucratic variables (rural land per person and urbanization).

4. Results.

Tables 2A-2C present the results of estimating four alternative specifications of the system in equation (1) by nonlinear three stage least squares. The main entry in each cell reports

---

[12]Education was measured as the proportion of the rural population in the district that had completed primary school but not finished high school. This definition avoids mechanical inclusion of doctors, nurses, teachers or administrators on both sides of the equation. Use of this variable as an instrument is suggested by the literature on political participation where education is one of its main determinants.

[13] In the nonlinear case use of powers of the exogenous variables as additional instruments in the first stage reduces the variances of the estimators in the subsequent stage provided the sample size is not significantly reduced as a result, for example Kelejian and Oates (1981, pp. 299-300).

the marginal effects as elasticities measured at the sample means, i.e., the elasticity of the dependent variable with respect to the independent variable measured at the means of both. For instance, the first row entry in Table 2A for column 4 tells us that a 1% increase in voter participation increases the proportion of doctors per 10 persons in a district by 1.8%.[14] The elasticity for the voter turnout variable is the largest in magnitude for all four specifications in each of the three equations.[15] The proportion of scheduled castes and the ratio of female to male voter turnout come in second depending on the specification.

Our most systematic and robust results are the following. First, the outcomes of the allocation process are very sensitive to political participation by the electorate. Higher voter turnout in a district leads to an increase in the public input in each equation and for every specification. The lowest value of the t-ratio for this variable, among all 12 cases, is 2.34. Combined with the fact that this elasticity is the highest in magnitude, by a wide margin, among all the variables in the model, we have strong evidence of responsiveness to the electorate in the provision of these public inputs by those who control the states' allocation mechanisms. That is, we have a process in which the decisions of the agents in the state governments respond to the signals sent by the citizens or principals. This is one aspect of a vigorous democracy in operation.

Second, there is discrimination in the outcomes of the allocation process on the basis of

---

[14]The specification consistent with the discussion in previous sections is the one in column 4 of each table and all our statements refer to this specification unless stated otherwise.

[15] Incidentally, Table 1 provides descriptive statistics on all the variables used in the analysis.

caste and religion. A higher proportion of scheduled castes and of muslims in the rural area of a district leads to a lowering of the public input in each equation and for every specification. The lowest absolute values of the t-ratio for each of these two variables, among all 12 cases, are 3.31 and 2.38, respectively. Thus we have substantial evidence of redistribution from these two minorities, and possibly their rural neighbors,[16] toward the majority through the allocation mechanisms for providing health and education services by the state governments.

Third, the common features of each state, including its allocation process, are important determinants of the provision of these three public inputs to the rural districts. All 17 state dummies are significantly different from zero at the 1% level in every specification presented in Tables 2A-C. Since we do not present the individual dummies for reasons of space, the last row of Tables 2A-C shows the pseudo R^2 obtained when the state dummies are excluded. In every instance there is a reduction in predictive power from excluding the state dummies; these reductions range from 1% to 34 % of the variation in the dependent variable and they are greater than 10% in 10 out of the 12 specifications.

Our remaining results vary in statistical robustness by equation, i.e., by the public input to which they apply, or by the specification of the equation or both. If we arbitrarily select a value of 1.96 for the t-ratio as a criterion for accepting or rejecting the null hypothesis that a variable belongs in the specification, we have a convenient mechanism for discussing the remaining

---

[16]Whether or not members of the majority who are neighbors of the minority are also discriminated against depends crucially on the extent of spatial segregation of the groups within the rural areas of a district, and we have no direct information on this issue.

results.[17]

Our wealth and income variables have negative signs in every equation and in every specification in which they are included. One of the two is statistically significant in each of the three equations (wealth in the equation for doctors and income in the other two equations). This provides evidence of a redistribution process toward poorer rural areas in the states' allocation mechanisms for providing health and education services. Wealth concentration, as measured by the proportion of landless laborers in the rural areas of a district, has no statistically discernible effect on the outcomes of the states' allocation mechanisms in any specification or equation.

The proportion of urban population in a district increases the provision of medical services to the rural areas of this district in the form of doctors and nurses and other health technicians, but it has no effect on the provision of teachers. This suggests that lower costs to the state bureaucracies of providing medical services in rural areas of more urbanized districts do increase the availability of these services. The lack of a similar effect for teachers may be due to the greater abundance of this resource in general, for example Table 1 shows that on average there are 8 teachers for every doctor or nurse in the rural areas of districts. Bureaucratic rules based on geography or population have a weak effect on outcomes. They have no effect in the doctors' equation or in our preferred specification in the nurses' equation and the effect on the teachers' equation is sensitive to the inclusion of other variables in the equation.

In contrast to what would be expected from the public choice literature for the U.S., the ratio of female to male voter turnout has no effect on the outcomes of the states' allocation

---

[17] Of course, this mechanism implies either a 2.5% or a 5% level of significance depending on the specification of the alternative hypothesis.

mechanisms for nurses and other health technicians or in our preferred specification for doctors. Nonetheless, it has a very robust positive effect, statistically and substantively, on the provision of teachers. Similar to their U.S. counterparts, political participation by females in India differs from that of males in that it leads to a greater provision of educational inputs to rural areas of their district.

Finally, the coefficient of voting constituencies is negative in all of the possible cases and it is statistically significant in the preferred specification in all three equations. Hence, the urban bias generated by a political system based on population affects the outcomes of the states' allocation mechanism by lowering the inputs of medical and educational services provided to a district's rural areas.

Since our analysis and results suggest that the state in which a district is located matters, we analyze the sensitivity of the estimated elasticities to their evaluation at the sample means through the following experiment. We grouped the states according to their per capita income level into three groups (high, middle and low)[18] and we evaluated the elasticities at the sample means of the variables for each state. Tables 3A-3B present state elasticities, which were estimated in the preferred specification (the last column in Tables 2A-2C), for voter turnout and for the proportions of rural scheduled castes.

One striking pattern emerges from these tables: there is a systematic increase in the absolute value of the elasticities between the low and middle or high income states for voter

---

[18]We used the classification of states according to per capita income in Rao (1996, p.18), which led us to drop four states from the analysis because he classifies them as special category states.

turnout. This pattern does not arise with respect to the proportion of scheduled castes.

If one looks at the states classified as low income in Table 3A, one finds that in each of the three cases there is no elasticity of voter turnout for these states that is higher than any of the corresponding elasticities in the middle or high income states. Since this result involves 120 comparisons, we have a very robust indication that there is some threshold effect with respect to state per capita income which leads low income states to be less responsive to signals from voters in their allocation decisions with respect to public inputs.[19]

By contrast, the absolute value of the elasticity of scheduled castes with respect to the public input (Table 3B) is lower for the low income states in only 72 out of the 120 possible comparisons. Indeed, a sign test of the hypothesis that the differences between low income states and middle or high income states are random can not reject the null hypothesis at the 1% level of significance for schedule castes while it rejects the same null hypothesis at the 1% level as well as higher levels for voter turnout.

5. Concluding Remarks.

By putting together the widely used district data with a recently constructed data set on political participation, we have constructed a unique data set which can be used to addresses important questions that have not been asked before. Namely, what determines the allocation of publicly-provided health and education services to households in India's rural districts? and what

---

[19]Interestingly, Azariadis and Lahiri (1997) show analytically that threshold effects can lead voters at low income levels to choose low ability agents that make economies grow slower, because they don't want to pay the higher taxes associated with high ability agents. In our case the interpretation would be that these thresholds lead voters in low income states to send the message that they don't want as many of these public inputs as voters in middle or high income states, perhaps because they prefer other services.

features of the democratic process play a role in these allocation processes?

Part of the reason for the neglect of these questions by economists is the lack of well defined structural models in which to search for the answers. We have overcome this limitation in two practical ways: First, by studying the main characteristics of India's institutional structure we have been able to identify key features of the allocation process which condition our empirical analysis. For instance, in India the state governments are the crucial decision makers and, thus, an important component of the disturbance terms generating the allocation outcomes for their districts. Second, by drawing ideas from the existing economic literature we obtain a general framework in which to analyze these questions: namely, a multilevel principal-agent framework.

Implementing this framework empirically generates several robust and provocative results about the determinants of the outcomes of these allocation processes. Fitting India's democratic nature, the signals sent to the agents by the principals through their voting participation are the most important determinants of these outcomes. Consistent with the redistributive nature of most democracies, we find evidence of redistribution against minorities in the outcomes of the states' allocation mechanisms for providing medical and education services. While this result is most robust and consistent with respect to scheduled castes and muslims, it also manifests itself to a lesser extent with respect to the wealthy. Finally, characteristics of individual states are also important and difficult to observe determinants of these allocation outcomes. For instance we found indirectly that high levels of state per capita income, for example, lead to a greater responsiveness of the states' allocation mechanisms to voting participation.

Our analysis is also suggestive with respect to the potential outcomes of further devolution of the power to allocate medical and educational services to lower levels of governments. Redistribution against scheduled castes and muslims is likely to diminish if these minorities are politically represented at the lower levels. Responsiveness to voter signals should increase. In so far as the devolution process to lower levels features the same separation of spending decisions from taxation decisions currently in place, one would expect urban bias and bureucratic features of the allocation process to continue to play some role in determining outcomes. Indeed, bureaucratic features may play an even greater role if the devolution in terms of political power is not accompanied by a devolution in terms of the organization of the public administration system, because of a more profound principal-agent problem between locally elected politicians and state-level bureaucrats.

References

Azariadis, Costas and Amartya Lahiri. 1997. "Do Rich Countries Choose Better Governments?," mimeo, Los Angeles, CA: D. of Economics, UCLA.

Ball, Roy W. and Johannes F. Linn. 1992. *Urban Public Finance in Developing Countries*, Oxford: Oxford University Press.

Crain, W. Mark, and Thomas H. Deaton. 1978. "A Note on Political Participation as Consumption Behavior," *Public Choice*, 32, pp. 131-135.

Davoodi, Hamid, and Heng-fu Zou. 1997. "Fiscal Decentralization and Economic Growth: A Cross- Country Study," *Journal of Urban Economics*, forthcoming.

Deaton, Angus. 1995. "Data and Econometric Tools for Development Analysis," in J. Behrman and T.N. Srinivasan (eds.) *Handbook of Development Economics* (vol. IIIA), Amsterdam: North Holland Press.

Duggal, Ravi, Sunil Nandraj and Asha Vadair. 1995. "Health Expenditures across States-Part I," *Economic and Political Weekly*. April 15.

Findlay, Ronald. 1991. "The New Political Economy: Its Explanatory Power for LDC's," in Gerald Meier (ed.) *Politics and Policy Making in Developing Countries: Perspectives on the New Political Economy*, San Francisco: International Center for Economic Growth.

Fowler, Linda L. 1993. *Candidates, Congress and American Democracy*, Ann Arbor: University of Michigan Press.

Fraser, John. 1972. "Why do High Income People Participate more in Politics? The Wrong Answer," *Public Choice*, 13, pp. 115-18.

Frey, Bruno S. 1971. "Why Do High Income People Participate More in Politics?" *Public*

Choice, 11, pp.101-105.

_____. 1972. "Reply," *Public Choice*, 13, pp. 119-22.

Gleason, Suzanne. 1997. " Public Goods and Intrafamily Resource Allocation: Female Child Survival in India," mimeo, College Pk. Md.: D. of Economics, U. of Maryland.

_____. 1996. *Female Well-being and Public Goods*, Ph. D. Thesis, University of Maryland, College Park.

Hartmann, Horst. 1975. " Centre-State Relations in Education in India," Ch. 10 in Peter Meyer-Dohm (ed.) *Economic and Social Aspects of Indian Development*. Basel and Bombay:Horst Erdmann Verlag and Shakuntala Publishing House.

Kelejian, Harry H. and Wallace E. Oates. 1981. *Introduction to Econometrics: Principles and Applications*.New York: Harper & Row Publishers.

Leighley, Jan E. 1995. "Attitudes, Opportunities and Incentives: A Field Essay on Political Participation," *Political Research Quarterly*, 48, pp. 181-209.

Lin, Justin Yifu and Jeffrey B. Nugent. 1995. "Institutions and Economic Development," in J. Behrman and T.N. Srinivasan (eds.) *Handbook of Development Economics* (vol. IIIA), Amsterdam: North Holland Press.

Maheshwari, Shriram. 1979. *State Governments in India.* Delhi: The MacMillan Company of India Limited.

Manor, James. 1992. "The State of Governance," in Subroto Roy and William James (eds.) *Foundations of India's Political Economy: Towards an Agenda for the 1990's*, New Delhi: Sage Publications India Pvt Ltd.

Mcguire, Martin C. and Mancur Olson, Jr. 1996. "The Economics of Autocracy and Majority

Rule," *Journal of Economic Literature*, 34, 72-96.

Murthi, Mamta, Anne-Catherine Guio and Jean Dreze. 1995. "Mortality, Fertility and Gender Bias in India: A District-Level Analysis," *Population and Development Review*, 21, 745-82.

Niskanen, William. 1971. *Bureaucracy and Representative Government*, Chicago: Aldine-Antherton.

Oates, Wallace E. 1997. "Fiscal Federalism," mimeo, College Pk., Md.:D. of Economics, U. of Maryland.

Oomen, John and V. Annamalai. 1994. "Emerging Structure of Panchayati Raj in India: A Comparative Analysis of New Acts of States," *The Indian Journal of Public Administration*, 40, pp. 590-605.

Pack, Howard and Janet R. Pack. 1993. "Foreign Aid and the Question of Fungibility," *Review of Economics and Statistics*, 75, pp., 258-65.

Rao, M. Govinda. 1996. " Intergovernmental Fiscal Relations in a Planned Economy: The Indian Case," mimeo, Canberra: Australia South Asia Research Centre, Australian National University,

Rosenzweig, Mark R. 1988. "Labor Markets in Low-Income Countries," in H. Chenery and T.N.Srinivasan (eds.) *Handbook of Development Economics* (vol. I), Amsterdam: North-Holland.

Russell, Keith, P. 1972. "Political Participation and Income Level: An Alternative Explanation," *Public Choice*, 13, pp.113-14.

Singh, V.B. and Shankar Bose. 1987-88. *Elections in India: Data Handbook on Lok Sabha and*

Vidhan Sabha Elections 1952-85, New Delhi: Sage Publications.

Thakur, Ramesh. 1995. *The Government and Politics of India*, New York: St. Martin's Press.

Thomas, Sue. 1991. "The Impact of Women on State Legislative Policies," *The Journal of Politics*, 53(4) pp. 958-976.

Thomas, Sue and Susan Welch. 1991. "The Impact of Gender on Activities and Priorities of State Legislators," *The Western Political Quarterly*, 44(2) pp. 445-56.

Vanneman, Reeve and Douglas Barnes. 1993. *Indian District Data, 1961-1981 : Electronic Data File and Codebook*, College Pk., Md.: Center on Population, Gender and Social Inequality.

World Bank.1997. *World Development Report*, New York: Oxford University Press.

Zampelli, Ernest. 1986. "Resource Fungibility, the Flypaper Effect, and the Expenditure Impact of Grants-in-Aid," *Review of Economics and Statistics*, 68, pp., 33-40.

Zhang, Tao, and Heng-fu Zou. 1997. "Fiscal Decentralization, Public Spending, and Economic Growth in China," mimeo, World Bank, Policy Research Department.

Table 1: Summary Statistics

Variable	Mean	Standard Deviation
Doctors per 10 Population	0.0053	0.0028
Nurses per 10 Population	0.0052	0.0033
Teachers per 10 Population	0.042	0.019
Proportion of Eligible Population Voting in 1977-78 State Assembly Elections	0.58	0.13
Female/Male Voter Turnout Ratio	0.75	0.19
Number of Voting Constituencies	10.05	6.77
Proportion Scheduled Caste	0.18	0.082
Proportion Muslim	0.094	0.142
Cultivatable Land per Household	1.40	0.93
Agricultrual Productivity ('000 per Farm Worker)	0.85	0.65
Proportion of Farm Workers Landless	0.33	0.19
Rural Land per Person	0.10	0.45
Proportion Urban	0.19	0.12
Number of Observations = 325		

Table 2: NL3S Estimates[1]
A. Doctors
(Abs. Values of t-statistics)

Variable	1	2	3	4
Voter Turnout	3.36 (3.24)	2.29 (2.98)	2.49 (3.18)	1.83 (2.34)
Female/Male Voter Turnout	1.10 (2.42)	0.84 (2.05)	0.40 (1.23)	0.54 (1.62)
Number of Voting Constituencies	-0.11 (1.53)	-0.12 (1.81)	-0.098 (1.57)	-0.12 (2.05)
Proportion Rural Scheduled Caste	-0.41 (4.29)	-0.34 (3.79)	-0.29 (3.85)	-0.26 (3.46)
Proportion of Rural Muslims	-0.13 (3.31)	-0.12 (3.33)	-0.12 (3.80)	-0.11 (3.58)
Cultivatable Land per Farm Worker			-0.12 (1.97)	-0.13 (2.26)
Agricultural Productivity			-0.056 (0.72)	-0.060 (0.59)
Proportion Landless			-0.043 (0.36)	-0.036 (0.31)
Rural Land per Person		0.00010 (0.04)		0.00031 (0.10)
Proportion Urban		0.13 (3.22)		0.16 (4.03)
Pseudo R-Squared	0.27	0.40	0.47	0.53
Pseudo R-Squared omitting State Effects	0.06	0.06	0.29	0.31
Number of Observations = 325				

[1]The instrument matrix consisted of the included exogenous variables plus the ratio of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 2: NL3S Estimates[2]
B. Nurses
(Abs. Values of t-statistics)

Variable	1	2	3	4
Voter Turnout	3.57 (3.78)	1.50 (2.84)	3.27 (4.14)	1.93 (2.85)
Female/Male Voter Turnout	0.82 (1.65)	0.28 (0.74)	0.41 (1.04)	0.25 (0.72)
Number of Voting Constituencies	-0.26 (2.77)	-0.16 (2.38)	-0.22 (2.62)	-0.20 (2.65)
Proportion Rural Scheduled Caste	-0.79 (6.26)	-0.54 (5.93)	-0.60 (5.44)	-0.50 (5.29)
Proportion Rural Muslims	-0.23 (6.48)	-0.15 (5.18)	-0.19 (6.05)	-0.16 (4.99)
Cultivatable Land per Farm Worker			-0.036 (0.42)	-0.074 (1.11)
Agricultural Productivity			-0.42 (3.89)	-0.25 (2.24)
Proportion Landless			-0.16 (1.22)	-0.13 (1.31)
Rural Land per Person		0.0094 (4.01)		0.0060 (1.88)
Proportion Urban		0.11 (2.82)		0.16 (4.00)
Pseudo R-Squared	0.42	0.63	0.49	0.62
Pseudo R-Squared omitting State Effects	0.19	0.38	0.23	0.42
Number of Observations = 325				

[2]The instrument matrix consisted of the included exogenous variables plus the ratio of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 2: NL3S Estimates[3]
C. Teachers
(Abs. Values of t-statistics)

Variable	1	2	3	4
Voter Turnout	2.56 (2.55)	1.98 (2.58)	2.25 (2.42)	2.32 (2.50)
Female/Male Voter Turnout	1.87 (3.11)	1.49 (2.76)	1.18 (2.68)	1.23 (2.52)
Number of Voting Constituencies	-0.17 (2.11)	-0.12 (1.65)	-0.14 (2.11)	-0.16 (1.97)
Proportion Rural Scheduled Caste	-0.50 (4.72)	-0.46 (4.57)	-0.35 (3.72)	-0.39 (3.83)
Proportion Rural Muslims	-0.11 (2.88)	-0.11 (3.28)	-0.081 (2.38)	-0.10 (2.97)
Cultivatable Land per Farm Worker			-0.077 (1.41)	-0.081 (1.36)
Agricultural Productivity			-0.35 (2.76)	-0.36 (2.17)
Proportion Landless			-0.20 (1.66)	-0.17 (1.36)
Rural Land per Person		-0.0056 (1.80)		-0.0092 (2.11)
Proportion Urban		-0.062 (1.33)		0.023 (0.50)
Pseudo R-Squared	0.19	0.26	0.33	0.33
Pseudo R-Squared omitting State Effects	0.08	0.10	0.30	0.32
Number of Observations = 325				

[3]The instrument matrix consisted of the included exogenous variables plus the ratio of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 3: State Elasticities
A. Voter Turnout

State	Doctors	Nurses	Teachers
High Income			
Punjab	2.09	2.21	2.65
Haryana	2.04	2.15	2.60
Maharastra	2.19	2.30	2.75
Middle Income			
West Bengal	1.77	1.86	2.23
Karnataka	2.29	2.41	2.93
Andhra Pradesh	2.30	2.42	2.96
Tamil Nadu	1.96	2.05	2.46
Kerala	2.49	2.62	3.02
Low Income			
Rajasthan	1.70	1.79	2.19
Orissa	1.24	1.30	1.55
Uttar Pradesh	1.43	1.51	1.82
Madhya Pradesh	1.70	1.78	2.18
Bihar	1.60	1.68	2.04
At Sample Mean	1.83	1.93	2.32
/t-stat/	2.34	2.85	2.50

Table 3: State Elasticities
B. Scheduled Castes

State	Doctors	Nurses	Teachers
High Income			
Punjab	-0.45	-0.85	-0.65
Haryana	-0.31	-0.58	-0.45
Maharastra	-0.11	-0.21	-0.16
Middle Income			
West Bengal	-0.40	-0.75	-0.58
Karnataka	-0.25	-0.46	-0.36
Andhra Pradesh	-0.25	-0.46	-0.36
Tamil Nadu	-0.31	-0.58	-0.45
Kerala	-0.16	-0.29	-0.22
Low Income			
Rajasthan	-0.26	-0.49	-0.39
Orissa	-0.22	-0.41	-0.31
Uttar Pradesh	-0.34	-0.64	-0.50
Madhya Pradesh	-0.24	-0.45	-0.34
Bihar	-0.23	-0.44	-0.34
At Sample Mean	-0.26	-0.50	-0.38
/t-stat/	3.46	5.29	3.83

Table 1: Summary Statistics

Variable	Mean	Standard Deviation
Doctors per 10 Population	0.0053	0.0028
Nurses per 10 Population	0.0052	0.0033
Teachers per 10 Population	0.042	0.019
Proportion of Eligible Population Voting in 1977-78 State Assembly Elections	0.58	0.13
Female/Male Voter Turnout Ratio	0.75	0.19
Number of Voting Constituencies	10.05	6.77
Proportion Scheduled Caste	0.18	0.082
Proportion Muslim	0.094	0.142
Cultivatable Land per Household	1.40	0.93
Agricultrual Productivity ('000 per Farm Worker)	0.85	0.65
Proportion of Farm Workers Landless	0.33	0.19
Rural Land per Person	0.10	0.45
Proportion Urban	0.19	0.12
Number of Observations = 325		

Table 2: NL3S Estimates[1]
A. Doctors
(Abs. Values of t-statistics)

Variable	1	2	3	4
Voter Turnout	3.36 (3.24)	2.29 (2.98)	2.49 (3.18)	1.83 (2.34)
Female/Male Voter Turnout	1.10 (2.42)	0.84 (2.05)	0.40 (1.23)	0.54 (1.62)
Number of Voting Constituencies	-0.11 (1.53)	-0.12 (1.81)	-0.098 (1.57)	-0.12 (2.05)
Proportion Rural Scheduled Caste	-0.41 (4.29)	-0.34 (3.79)	-0.29 (3.85)	-0.26 (3.46)
Proportion of Rural Muslims	-0.13 (3.31)	-0.12 (3.33)	-0.12 (3.80)	-0.11 (3.58)
Cultivatable Land per Farm Worker			-0.12 (1.97)	-0.13 (2.26)
Agricultural Productivity			-0.056 (0.72)	-0.060 (0.59)
Proportion Landless			-0.043 (0.36)	-0.036 (0.31)
Rural Land per Person		0.00010 (0.04)		0.00031 (0.10)
Proportion Urban		0.13 (3.22)		0.16 (4.03)
Pseudo R-Squared	0.27	0.40	0.47	0.53
Pseudo R-Squared omitting State Effects	0.06	0.06	0.29	0.31
Number of Observations = 325				

[1]The instrument matrix consisted of the included exogenous variables plus the ratio of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 2: NL3S Esti .es[2]

B. Nurses

(Abs. Values of t-sta ics)

Variable	1	2		3	4
Voter Turnout	3.57 (3.78)	1.5 (2.8		3.27 (4.14)	1.93 (2.85)
Female/Male Voter Turnout	0.82 (1.65)	0.2 (0.7		0.41 (1.04)	0.25 (0.72)
Number of Voting Constituencies	-0.26 (2.77)	-0. (2.3		-0.22 (2.62)	-0.20 (2.65)
Proportion Rural Scheduled Caste	-0.79 (6.26)	-0. (5.9		-0.60 (5.44)	-0.50 (5.29)
Proportion Rural Muslims	-0.23 (6.48)	-0.1 (5.1		-0.19 (6.05)	-0.16 (4.99)
Cultivatable Land per Farm Worker				-0.036 (0.42)	-0.074 (1.11)
Agricultural Productivity				-0.42 (3.89)	-0.25 (2.24)
Proportion Landless				-0.16 (1.22)	-0.13 (1.31)
Rural Land per Person		0.00 (4.0			0.0060 (1.88)
Proportion Urban		0.1 (2.8			0.16 (4.00)
Pseudo R-Squared	0.42	0.6		0.49	0.62
Pseudo R-Squared omitting State Effects	0.19	0.3		0.23	0.42
Number of Observations = 325					

[2]The instrument matrix consisted of the included exogenous variables plus the r › of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 2: NL3S Estimates[3]
C. Teachers
(Abs. Values of t-statistics)

Variable	1	2	3	4
Voter Turnout	2.56 (2.55)	1.98 (2.58)	2.25 (2.42)	2.32 (2.50)
Female/Male Voter Turnout	1.87 (3.11)	1.49 (2.76)	1.18 (2.68)	1.23 (2.52)
Number of Voting Constituencies	-0.17 (2.11)	-0.12 (1.65)	-0.14 (2.11)	-0.16 (1.97)
Proportion Rural Scheduled Caste	-0.50 (4.72)	-0.46 (4.57)	-0.35 (3.72)	-0.39 (3.83)
Proportion Rural Muslims	-0.11 (2.88)	-0.11 (3.28)	-0.081 (2.38)	-0.10 (2.97)
Cultivatable Land per Farm Worker			-0.077 (1.41)	-0.081 (1.36)
Agricultural Productivity			-0.35 (2.76)	-0.36 (2.17)
Proportion Landless			-0.20 (1.66)	-0.17 (1.36)
Rural Land per Person		-0.0056 (1.80)		-0.0092 (2.11)
Proportion Urban		-0.062 (1.33)		0.023 (0.50)
Pseudo R-Squared	0.19	0.26	0.33	0.33
Pseudo R-Squared omitting State Effects	0.08	0.10	0.30	0.32
Number of Observations = 325				

[3]The instrument matrix consisted of the included exogenous variables plus the ratio of females to males in the population and its square and the squares of scheduled castes, muslim, proportion urban and rural land per person.

Table 3: State Elasticities
A. Voter Turnout

State	Doctors	Nurses	Teachers
High Income			
Punjab	2.09	2.21	2.65
Haryana	2.04	2.15	2.60
Maharastra	2.19	2.30	2.75
Middle Income			
West Bengal	1.77	1.86	2.23
Karnataka	2.29	2.41	2.93
Andhra Pradesh	2.30	2.42	2.96
Tamil Nadu	1.96	2.05	2.46
Kerala	2.49	2.62	3.02
Low Income			
Rajasthan	1.70	1.79	2.19
Orissa	1.24	1.30	1.55
Uttar Pradesh	1.43	1.51	1.82
Madhya Pradesh	1.70	1.78	2.18
Bihar	1.60	1.68	2.04
At Sample Mean	1.83	1.93	2.32
/t-stat/	2.34	2.85	2.50

Table 3: State Elasticities
B. Scheduled Castes

State	Doctors	Nurses	Teachers
High Income			
Punjab	-0.45	-0.85	-0.65
Haryana	-0.31	-0.58	-0.45
Maharastra	-0.11	-0.21	-0.16
Middle Income			
West Bengal	-0.40	-0.75	-0.58
Karnataka	-0.25	-0.46	-0.36
Andhra Pradesh	-0.25	-0.46	-0.36
Tamil Nadu	-0.31	-0.58	-0.45
Kerala	-0.16	-0.29	-0.22
Low Income			
Rajasthan	-0.26	-0.49	-0.39
Orissa	-0.22	-0.41	-0.31
Uttar Pradesh	-0.34	-0.64	-0.50
Madhya Pradesh	-0.24	-0.45	-0.34
Bihar	-0.23	-0.44	-0.34
At Sample Mean	-0.26	-0.50	-0.38
/t-stat/	3.46	5.29	3.83